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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/695,579	10/28/2003	Chan-Soo Hwang	678-1212 (P10803)	5358

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THE FARRELL LAW FIRM, P.C.  
333 EARLE OVINGTON BOULEVARD  
SUITE 701  
UNIONDALE, NY 11553

EXAMINER
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TRAN, KHAI

ART UNIT	PAPER NUMBER
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2611

MAIL DATE	DELIVERY MODE
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02/20/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

5H

<b>Office Action Summary</b>	<b>Application No.</b> 10/695,579	<b>Applicant(s)</b> HWANG ET AL.	
	<b>Examiner</b> KHAI TRAN	<b>Art Unit</b> 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 November 2007.
- 2a) ☐ This action is FINAL.
- 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4 and 6-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/26/2007 has been entered. Claims 5, 13-20 have been cancelled. Claims 1-4, 6-7, 8-12 are pending in this Office action.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-4 and 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shibutani (US 2003/0002518) in view of Ayman F. Naguib et al., "A Space-Time Coding Modem for High-Data-Rate Wireless Communications", IEEE Journal on Selected Areas in Communications", Vol. 16, No. 8, October 1998, pp. 1459-1478 (hereinafter Naguib) and Yi (U.S. Pat. 6,094,427).

Regarding claims 1 and 8, Shibutani discloses an apparatus for transmitting a sequence for channel estimation through M transmission antennas in a mobile communication system, the apparatus comprising: a sequence generator for generating the sequence for the channel estimation (Figure 3, paragraphs 6, 14, 43-46); M modulators for modulating information bit streams encoded as a punctured code into modulation symbol streams respectively (Figure 3, elements 144, 146, 147, 148, paragraphs 6, 14, 43-46); and M multiplexers individually connected to the M transmission antennas, for multiplexing the punctured signals output from the M puncturers and the sequence to be inserted in the predetermined position (Figure 3, elements 144, 146, 147, 148, paragraphs 6, 14, 43-46). Shibutani fails to disclose M puncturers for puncturing at least one modulation symbol in a predetermined position at each transmission antenna for each of the modulation symbol streams output from the M modulators; and wherein at least one of puncturing positions for the modulation symbol streams is different from other puncturing positions at each antenna in a same transmission period.

In the same field of endeavor, however, Yi discloses a plurality of puncturers for puncturing at least one modulation symbol in a predetermined position at each transmission antenna for each of the modulation symbol streams output from the M modulators; and wherein at least one of puncturing positions for the modulation symbol streams is different from other puncturing positions at each antenna in a same transmission period (Figure 6, col. 14, line 35 to col. 15, line 40). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the plurality of puncturers as taught by Yi for puncturing at least one modulation symbol in a predetermined position at each transmission antenna for each of the modulation symbol streams output from the M modulators into the teachings of Shibutani in order to increase system capacity through improved handoff reliability.

Shibutani is not specific about inserting the sequence in at least on punctured modulation symbol (even though the interpretation of "0" elements also hold).

In the same field of endeavor, however, Naguib discloses inserting the sequence in at least on punctured modulation symbol (page 1460, col. 1, paragraph 1). Therefore, it would have been obvious to one skilled in the art at the time of invention was made to use inserting the sequence in at least on punctured modulation symbol as taught by Naguib in the system of Shibutani and Yi to use pilot sequences to estimate different fading channels, translation: channel estimation (page 1460, col. 1, paragraph 1).

Regarding claims 2 and 9, Shibutani further discloses wherein the M puncturers each have a same number of modulation symbols where the sequence is inserted, for the modulation symbol streams output from the M modulators (paragraphs 43 - 46).

Regarding claims 3 and 10, Yi further discloses wherein the M puncturers each periodically repeat a position where the sequence is inserted, for the modulation symbol streams output from the M modulators (col. 14, lines 35-65).

Regarding claims 4 and 11, Shibutani further discloses wherein the sequence is a pilot sequence (paragraphs 6, 14, 43 - 46).

5. Claims 6 - 7 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shibutani (US 2003/0002518) in view of Ayman F. Naguib et al., "A Space-Time Coding Modem for High-Data-Rate Wireless Communications", IEEE Journal on Selected Areas in Communications", Vol. 16, No. 8, October 1998, pp. 1459-1478 (hereinafter Naguib) and Yi (U.S. Pat. 6,094,427) in further view of Walton et al. (US 2004/0156328)

Regarding claims 6 - 7 and 12, Shibutani discloses a position where the sequence is inserted is determined according to a puncturing matrix P1 and the sequence is inserted in a position of an element "0." (figures 1 and 4, figure 3 elements 144, 146, 147, 148, paragraphs 6, 14, 43 - 46). Shibutani is not explicit about wherein if M is 2 and a number of symbols constituting the modulation symbol stream is 4, a puncturing matrix defined as a specific matrix.

In the same field of endeavor, however, Walton discloses an apparatus for transmitting where there are a plurality of processing streams that including a puncturer a modulating function (mapping) and then multiplexing pilot symbols with the punctured modulation stream (figure 8 elements 810x- 810y, 120x- 120y, figure 9 elements 920, 924, 926, Pilot Symbols, paragraphs 106 - 116). Therefore it would have been obvious to one skilled in the art at the time of invention was made to use an apparatus for transmitting where there are a plurality of processing streams that including a puncturer a modulating function (mapping) and then multiplexing pilot symbols with the punctured modulation stream as taught by Walton in the system of Shibutani to facilitate random access ability in the wireless system (paragraph 4). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use any puncturing pattern. Applicant has not disclosed that the specific puncturing pattern provides an advantage, is used for a particular purpose or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with any puncturing pattern. Therefore, it would have been obvious to use any puncturing pattern to one of ordinary skill in this art to modify any puncturing pattern to the claimed puncturing pattern to provide proper, rate matching, rate to fit the physical channel.

### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Rooyen et al (US 2004/0057531) disclose a method and apparatus for space-time turbo-coded modulation.

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7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KHAI TRAN whose telephone number is (571) 272-3019. The examiner can normally be reached on 7:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on (571) 272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



KHAI TRAN  
Primary Examiner  
Art Unit 2611

KT  
February 13, 2008